SPEC® CFP2006 Result
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Hewlett-Packard Company

ProLiant DL560 Gen9
(1.70 GHz, Intel Xeon E5-4610 v3)

$SPECfp^{®}2006 =$ 67.6

$SPECfp\_base2006 =$ 64.8

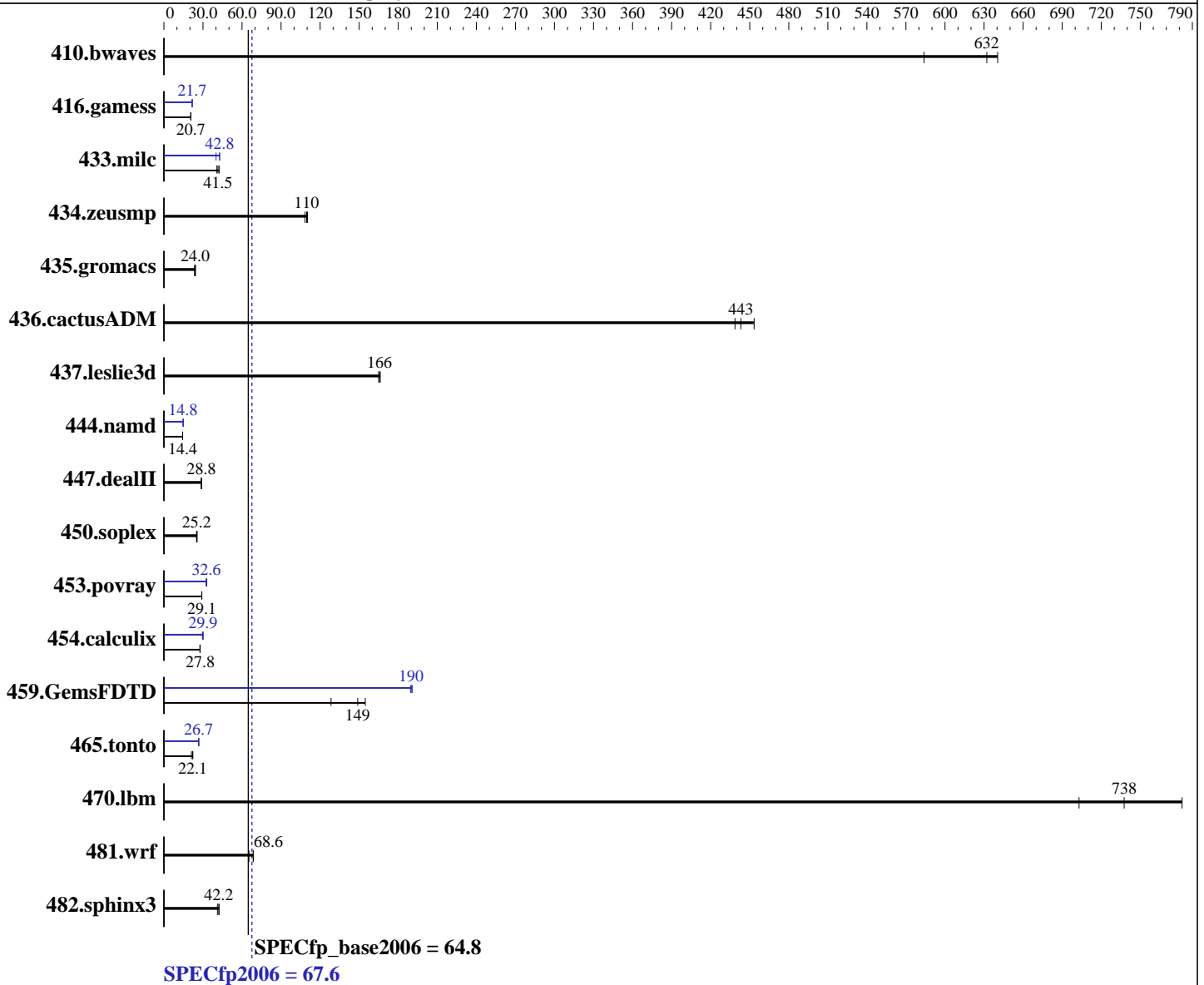|	
CPU2006 license: 3	**Test date:** Jun-2015
Test sponsor: Hewlett-Packard Company	**Hardware Availability:** Jun-2015
Tested by: Hewlett-Packard Company	**Software Availability:** Oct-2014

410.bwaves 632
416.gamess 21.7 / 20.7
433.milc 42.8 / 41.5
434.zeusmp 110
435.gromacs 24.0
436.cactusADM 443
437.leslie3d 166
444.namd 14.8 / 14.4
447.dealII 28.8
450.soplex 25.2
453.povray 32.6 / 29.1
454.calculix 29.9 / 27.8
459.GemsFDTD 190 / 149
465.tonto 26.7 / 22.1
470.lbm 738
481.wrf 68.6
482.sphinx3 42.2

SPECfp_base2006 = 64.8
SPECfp2006 = 67.6

Hardware

CPU Name:	Intel Xeon E5-4610 v3
CPU Characteristics:	
CPU MHz:	1700
FPU:	Integrated
CPU(s) enabled:	40 cores, 4 chips, 10 cores/chip
CPU(s) orderable:	2,4 chip
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core

Continued on next page

Software

Operating System:	SUSE Linux Enterprise Server 12 (x86_64) Kernel 3.12.28-4-default
Compiler:	C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux; Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)

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L3 Cache:	25 MB I+D on chip per chip
Other Cache:	None
Memory:	512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)
Disk Subsystem:	2 x 400 GB SAS SSD, RAID 1
Other Hardware:	None

Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	23.3	584	21.2	640	**21.5**	**632**	23.3	584	21.2	640	**21.5**	**632**
416.gamess	947	20.7	948	20.7	**948**	**20.7**	900	21.8	**901**	**21.7**	903	21.7
433.milc	**221**	**41.5**	216	42.4	226	40.7	**215**	**42.8**	214	42.8	229	40.1
434.zeusmp	82.5	110	**83.0**	**110**	83.9	108	82.5	110	**83.0**	**110**	83.9	108
435.gromacs	304	23.5	**297**	**24.0**	295	24.2	304	23.5	**297**	**24.0**	295	24.2
436.cactusADM	**27.0**	**443**	27.2	439	26.4	453	**27.0**	**443**	27.2	439	26.4	453
437.leslie3d	56.6	166	57.0	165	**56.7**	**166**	56.6	166	57.0	165	**56.7**	**166**
444.namd	557	14.4	**557**	**14.4**	558	14.4	**542**	**14.8**	542	14.8	542	14.8
447.dealII	396	28.9	**398**	**28.8**	399	28.7	396	28.9	**398**	**28.8**	399	28.7
450.soplex	**331**	**25.2**	327	25.5	332	25.1	**331**	**25.2**	327	25.5	332	25.1
453.povray	183	29.1	183	29.1	**183**	**29.1**	161	33.0	**163**	**32.6**	164	32.4
454.calculix	299	27.6	296	27.8	**296**	**27.8**	274	30.2	**276**	**29.9**	279	29.6
459.GemsFDTD	82.6	128	68.6	155	**71.3**	**149**	55.6	191	**55.8**	**190**	56.0	190
465.tonto	**445**	**22.1**	443	22.2	466	21.1	367	26.8	**368**	**26.7**	369	26.7
470.lbm	**18.6**	**738**	19.5	703	17.6	782	**18.6**	**738**	19.5	703	17.6	782
481.wrf	171	65.4	**163**	**68.6**	163	68.6	171	65.4	**163**	**68.6**	163	68.6
482.sphinx3	461	42.3	**462**	**42.2**	474	41.1	461	42.3	**462**	**42.2**	474	41.1

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

Platform Notes

```
BIOS Configuration:
 Intel Hyperthreading set to Disabled
 HP Power Profile set to Custom
 HP Power Regulator to HP Static High Performance Mode
 Minimum Processor Idle Power Core State set to C6 State
 Energy/Performance Bias set to Maximum Performance
 Collaborative Power Control set to Disabled
```

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Test date: Jun-2015
Hardware Availability: Jun-2015
Software Availability: Oct-2014

Platform Notes (Continued)

```
 Thermal Configuration set to Maximum Cooling
 Processor Power and Utilization Monitoring set to Disabled
 Memory Refresh Rate set to 1x Refresh
Sysinfo program /home/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on dl560gen9jks Wed Jun 24 21:27:59 2015

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
  http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-4610 v3 @ 1.70GHz
      4 "physical id"s (chips)
      40 "processors"
   cores, siblings (Caution: counting these is hw and system dependent.  The
   following excerpts from /proc/cpuinfo might not be reliable.  Use with
   caution.)
      cpu cores : 10
      siblings  : 10
      physical 0: cores 0 2 3 4 8 9 10 11 12
      physical 1: cores 0 2 3 4 8 9 10 11 12
      physical 2: cores 0 2 3 4 8 9 10 11 12
      physical 3: cores 0 2 3 4 8 9 10 11 12
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:        529312800 kB
   HugePages_Total:         0
   Hugepagesize:         2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 0
      # This file is deprecated and will be removed in a future service pack or
      release.
      # Please check /etc/os-release for details about this release.
   os-release:
      NAME="SLES"
      VERSION="12"
      VERSION_ID="12"
      PRETTY_NAME="SUSE Linux Enterprise Server 12"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12"

uname -a:
```

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Software Availability: Oct-2014

Platform Notes (Continued)

```
    Linux dl560gen9jks 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
    (9879bd4) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Jun 24 11:37 last=5

  SPEC is set to: /home/cpu2006
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda4       xfs   331G  6.0G  325G   2% /home
  Additional information from dmidecode:

    Warning: Use caution when you interpret this section. The 'dmidecode' program
    reads system data which is "intended to allow hardware to be accurately
    determined", but the intent may not be met, as there are frequent changes to
    hardware, firmware, and the "DMTF SMBIOS" standard.

    BIOS HP P85 03/05/2015
    Memory:
    24x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1600 MHz
    16x UNKNOWN NOT AVAILABLE
    8x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1600 MHz

  (End of data from sysinfo program)
Regarding the sysinfo display about the memory installed, the correct amount of
memory is 512 GB and the dmidecode description should have two lines reading as:
    24x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1600 MHz
    8x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1600 MHz
```

General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"
OMP_NUM_THREADS = "40"

 Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB
 memory using RedHat EL 7.0
```

Base Compiler Invocation

C benchmarks:
    icc   -m64

C++ benchmarks:
    icpc -m64

Fortran benchmarks:
    ifort -m64

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Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
```
icc   -m64 ifort -m64
```

Base Portability Flags

```
    410.bwaves: -DSPEC_CPU_LP64
    416.gamess: -DSPEC_CPU_LP64
      433.milc: -DSPEC_CPU_LP64
    434.zeusmp: -DSPEC_CPU_LP64
   435.gromacs: -DSPEC_CPU_LP64 -nofor_main
  436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
   437.leslie3d: -DSPEC_CPU_LP64
      444.namd: -DSPEC_CPU_LP64
     447.dealII: -DSPEC_CPU_LP64
     450.soplex: -DSPEC_CPU_LP64
     453.povray: -DSPEC_CPU_LP64
    454.calculix: -DSPEC_CPU_LP64 -nofor_main
   459.GemsFDTD: -DSPEC_CPU_LP64
      465.tonto: -DSPEC_CPU_LP64
       470.lbm: -DSPEC_CPU_LP64
       481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
    482.sphinx3: -DSPEC_CPU_LP64
```

Base Optimization Flags

C benchmarks:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
    -ansi-alias
```

C++ benchmarks:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
```

Fortran benchmarks:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
```

Benchmarks using both Fortran and C:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
    -ansi-alias
```

Peak Compiler Invocation

C benchmarks:
```
    icc   -m64
```

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Peak Compiler Invocation (Continued)

C++ benchmarks:
```
icpc  -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc   -m64 ifort -m64
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
    433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
              -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
              -auto-ilp32 -ansi-alias

    470.lbm: basepeak = yes

 482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
    444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
              -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
              -fno-alias -auto-ilp32

   447.dealII: basepeak = yes

   450.soplex: basepeak = yes

   453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
               -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4
               -ansi-alias
```

Fortran benchmarks:

```
   410.bwaves: basepeak = yes

   416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
               -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2
               -inline-level=0 -scalar-rep-
```

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Peak Optimization Flags (Continued)

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2`
`-inline-level=0 -opt-prefetch -parallel`

465.tonto: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)`
`-inline-calloc -opt-malloc-options=3 -auto -unroll4`

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: `-xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias`

481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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